

REMARKS

Claims 10, 18, 45, and 55 have been amended to delete the phrase “an exposed metal layer,” and to correct punctuation. Claim 55 has also been amended to recite a “first etch solution.” Claims 11-17, 22-28, 46-52, and 57-59 have been amended to improve antecedent basis. Claim 65 has been amended to correct punctuation.

The Final Office Action mailed September 6, 2006, has been received and reviewed. Claims 10-19, 21-28, 45-55, and 57-67 are currently pending in the application. Claims 10-19, 21-28, 45-55, and 57-66 stand rejected. Claim 67 has been objected to as being dependent upon a rejected base claim, but the indication of allowable subject matter in such claim is noted with appreciation. Applicants propose to amend claims 10-18, 22-28, 45-52, 55, 57-59, and 65, and respectfully request reconsideration of the application as proposed to be amended herein.

The proposed amendments to claims 10-18, 22-28, 45-52, 55, 57-59, and 65 should be entered by the Examiner because the amendments place the application in condition for allowance. Alternatively, the amendments place the application in better form for appeal.

Claim Objections

Claims 11-17, 19, 22-28, 46-54, 55, and 57-63 are objected to due to informalities in the claim language. The Examiner has objected to dependent claims 11-17, 19, 22-28, 46-54, and 57-63 as being unclear for using the terms “a,” “an,” and “at least one.” The Examiner states that the claims are unclear because they use these terms to refer back to previously-cited elements in the independent claims. Office Action of September 6, 2006, p. 2. Applicants have amended portions of claims 11-17, 22-28, 46-52, and 57-59 and respectfully submit that the claims use proper antecedent basis. The portions of the pending, dependent claims objected to by the Examiner properly recite the respective method limitation from the respective independent claims. Furthermore, the changes suggested by the Examiner would introduce improper antecedent basis into the claims.

Applicants have amended claim 55 to recite “a first etch solution.”

Applicants respectfully submit that the scope of claims 11-17, 19, 22-28, 46-54, 55, and 57-63 is clear and request that the objection be withdrawn.

35 U.S.C. § 102(e) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent Publication No. 2005/0077913 to Watkins *et al.*

Claims 10-14, 18, 19, 21-25, 45-49, 53-60, 64, and 67 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2005/0077913 to Watkins *et al.* (“Watkins”). Claim 56 was previously canceled and, therefore, is improperly included in this rejection. Claim 67 was included by the Examiner in this rejection, even though claim 67 has been indicated as reciting allowable subject matter. To be fully responsive, Applicants include arguments against the rejection of claim 67. Applicants respectfully traverse the obviousness rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Watkins discloses a method of fabricating a compliant contact structure. Watkins at paragraph [0023]. The compliant contact structure is fabricated by forming a contact slot in a substrate. *Id.* at paragraph [0025]. The contact slot is formed by laser ablating the substrate and cleaning the contact slot with a solution of tetramethylammonium hydroxide (“TMAH”) or TMAH and propylene glycol. *Id.* at paragraphs [0025] and [0028]. After cleaning, an insulative layer is formed on sidewalls of the contact slot, a seed layer is formed over the insulative layer, and a conductive layer is formed over the seed layer. *Id.* at paragraphs [0030], [0031], and [0034]. The conductive layer forms a conductor. *Id.* at paragraph [0036]. A contact bulk pit is formed in the substrate by chemical etching, mechanical etching, or laser ablating. *Id.* at paragraph [0036]. Additional portions of the substrate, contact sidewalls, and insulative layer are removed using a solution of TMAH and glycol without significantly etching the conductor. *Id.* at paragraph [0037].

Watkins does not expressly or inherently describe each and every element of claim 10 because Watkins does not disclose the element of “removing the silicon layer without removing

at least one of an exposed oxide layer, an exposed nitride layer, and an exposed polyimide layer also present on the semiconductor substrate.”

Dependent claims 11-14 are allowable, *inter alia*, as depending from an allowable base claim.

Watkins does not expressly or inherently describe each and every element of claim 18 because Watkins does not disclose the element of “removing the HAZ without removing at least one of an exposed oxide layer and an exposed nitride layer present on the silicon substrate.”

Dependent claims 19 and 21-25 are allowable, *inter alia*, as depending from an allowable base claim.

Watkins does not expressly or inherently describe each and every element of claim 45 because Watkins does not disclose the element of “removing the HAZ without removing at least one of an exposed oxide layer, an exposed nitride layer, and an exposed polyimide layer present on the silicon substrate.”

Dependent claims 46-49, 53, and 54 are allowable, *inter alia*, as depending from an allowable base claim.

Watkins does not expressly or inherently describe each and every element of claim 55 because Watkins does not disclose the element of “removing the HAZ without removing at least one of an exposed oxide layer and an exposed nitride layer present on the silicon substrate.”

Dependent claims 57-60, 64, and 67 are allowable, *inter alia*, as depending from an allowable base claim.

Claim 67 is further allowable because Watkins does not expressly or inherently describe forming a passivation layer on sidewalls of the aperture before filling the aperture with the conductive material.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on Watkins in view of Sachem Spec Sheet 379

Dependent claims 15-17, 26-28, 50-52, and 61-63 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watkins in view of Sachem Spec Sheet 379 (“Sachem”). Applicants respectfully traverse this rejection, as hereinafter set forth.

Since the rejected claims are dependent claims, each of the rejected claims includes all of the limitations of the claim from which it depends. The Examiner has not rejected independent claims 10, 18, 45, and 55 as being obvious in light of the cited references. Since a dependent claim is obvious only if the independent claim from which it depends is obvious, claims 15-17, 26-28, 50-52, and 61-63, which depend from one of independent claims 10, 18, 45, or 55, are allowable. *See In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03. As such, the obviousness rejection of claims 15-17, 26-28, 50-52, and 61-63 should be withdrawn.

Obviousness Rejection Based on Watkins in view of Japanese Patent no. 06-041770 to Takehiko et al.

Dependent claims 65 and 66 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watkins in view of Japanese Patent No. 06-041770 to Takehiko *et al.* (“Takehiko”). Applicants respectfully traverse this rejection, as hereinafter set forth.

The teachings of Watkins are as previously summarized.

Takehiko teaches cleaning or etching a silicon wafer using at least one of hydrofluoric acid, hydrochloric acid, nitric acid, hydrogen peroxide, acetic acid, ammonium fluoride, and phosphoric acid.

The Examiner has not rejected independent claim 55 as being obvious in light of Watkins and Takehiko. Since claims 65 and 66 depend from claim 55, each of these claims is allowable, *inter alia*, as depending from an allowable base claim.

Claims 65 and 66 are further allowable because the cited references do not teach or suggest an etch solution that comprises ammonium fluoride, phosphoric acid, water, hydrogen peroxide, and at least one organic solvent.

Objections to Claims/Allowable Subject Matter

Claim 67 stands objected to as being dependent upon a rejected base claim, but is indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form. Applicants note with appreciation the indication of allowable subject matter,

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but respectfully submit that independent claim 55 is allowable in its present state for the reasons set forth herein.

ENTRY OF AMENDMENTS

The proposed amendments to claims 10-18, 22-28, 45-52, 55, 57-59, and 65 should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add new matter to the application. Further, the amendments do not raise new issues or require a further search. Finally, if the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

CONCLUSION

Claims 10-19, 21-28, 45-55, and 57-67 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, the Examiner is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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